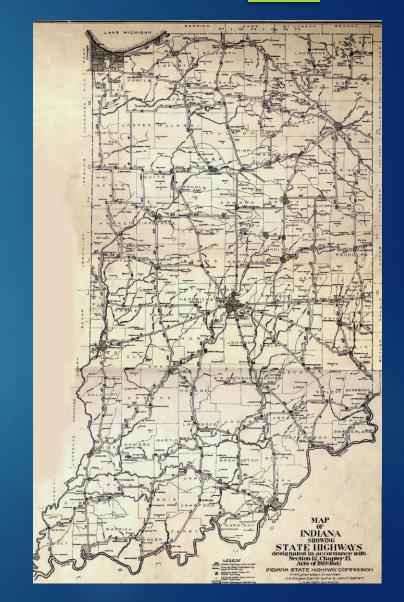
## GIS DAY

**EVOLVING ASSET MANAGEMENT AT INDOT** 

## INDOT is 100 Years old this year

	4040		
Indiana Then & Now	1919	2019	
Population	2.9 million	6.6 million	
1 opulation	2.0 111111011	0.0 111111011	
Median household income	\$2,933	\$46,242	
Number of automobile registrations	227,255	5.6 million	
Average price of a new car	\$295	\$37,577	
Total miles of roads	73,347	97,553	
Centerline miles of state-managed roads	4,100	11,206	
~			
Centerline miles of paved state-managed roads	800	11,206	
,			
Annual state highway investment	\$400,691	\$1.5 billion	

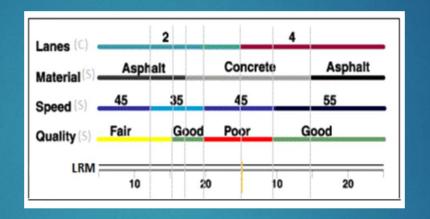


#### Tracking assets in 2003

- Drawings moving from CAD to GIS
- Road Log moving from Main frame to EXOR
- Road life was maintained on index cards in a file cabinet
- Spreadsheets everywhere, Access databases everywhere
- File storage growing in leaps and bounds
- Asset management in that day
  - Wholesale replacement of certain assets at end of fixed period
  - Worst first, where/if we had an idea
  - Specific Inventories lacking, inspection culture not present.
  - Difficulty finding our stuff

#### What we are doing in 2019

AdvancedLinear referencing



- Base road network
  - ▶ Highways, County & Local Government, Railways
- Road way characteristics.
  - Used when positional accuracy is less critical, FHWA is requiring on LRS

#### What does that look like?

- ▶ The ALRS managed with ArcMap & Roads and highways toolbar
  - Base network editing, processing and administration
    - Multi user editing
    - Workflow management
    - Temporal data management
  - Components of the ALRS
    - Metadata, locks, Edit Log, Event behavior rules
    - Centerline layer, centerline sequence table, Calibration points
    - Route layer, event tables
  - Modifications to the base network affect the events which respond based on their event behavior rules.

#### Demo Network Edit

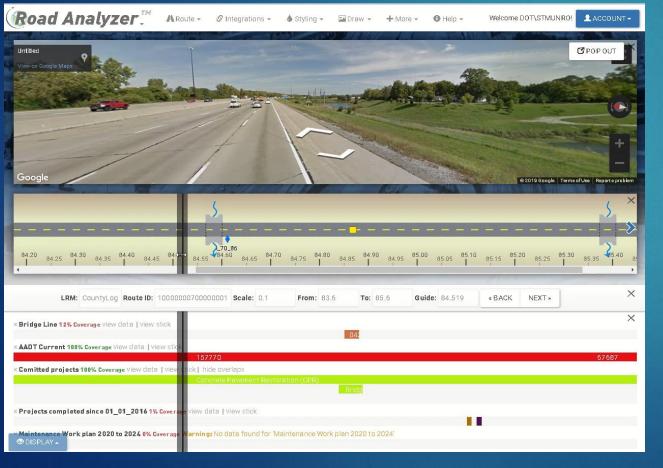
#### What does that look like?

- The ALRS events managed using the Event Editor
  - Manages tables of characteristics or assets
  - Traditional versioning + root version locking
  - ▶ Temporal, just like its host network
- Events managed in bulk
  - Events may be loaded to the network in bulk
  - Require temporal fields, valid route and measure values
- Active and snapshot data can be registered events
- External event data can be registered and has a mechanism for notifying external parties of change to the network/events

## Demo Event Edit

#### 4D, 3D, 2D. How about 1D?

Strip mapping



# What does it look like managing assets off the ALRS

- ► ESRI Collector
  - Asset inventory
    - ▶ Capture requirements in a <u>spreadsheet</u> for collaborative sessions
    - Build schema and fill with data as available. (fill using FME as necessary)
    - ▶ Publish <u>feature service</u>, enable sync feature but disable delete feature
    - Create and configure web map and web app
    - ▶ Test that requirements are met, adjust web **map/app** as per widget needs
  - Asset Inspection
    - ▶ Hang multiple inspections off the inventoried asset.
    - ▶ 1:M relationship and each inspection can have multiple attachments
    - Some assets themselves have assets that need inspections. Grandparent: Parent: Child.... 1:M:M ..... Lift station>>Generator or Pump >> >> Inspections

#### Helping the effort

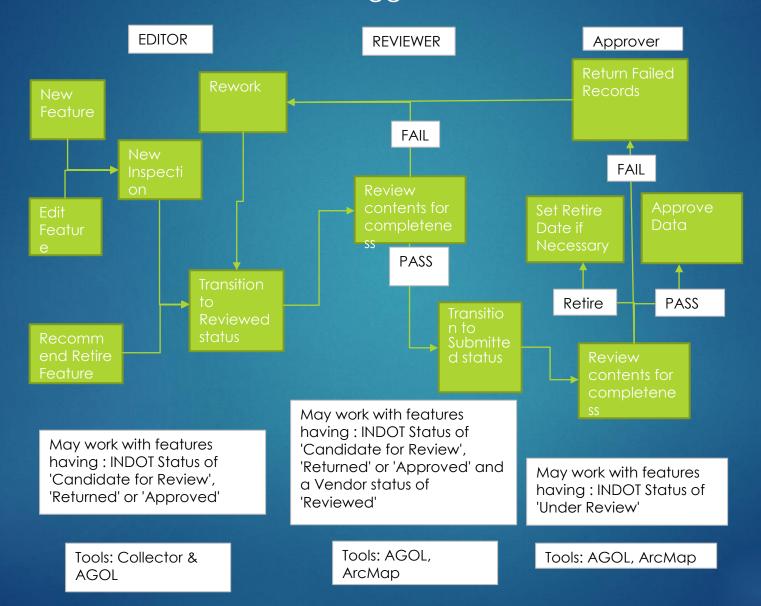
- Schema, default values for most common response to certain fields
- DB Triggers that help the workflows, moving data through the swim lanes. Some vendor statuses trigger other fields and vice versa
- Editor tracking
  - Last edited user, last edited date
  - Push created date into the inspection date

## Helping the effort

Schema, default values for most common response to certain fields

Inlet	Point	Last Edit Operation	New, Moved, Changed attributes, Moved and Changed, Retire	New	The data collector identifies the last operation
		Vendor Status	Collected, Reviewed, Submitted, Returned to Contractor	Collected	Contractor can't edit 'Submitted' records, INDOT can set Returned to Contractor
		INDOT Status	Pending, Returned, Approved	Pending	Project Manager/Engineer Approves or Returns (read only to vendor)
		Install_Date	Format MM/DD/YYYY	Null	Isindirectly required
		Retired Date	Format MM/DD/YYYY	Null	This field Is not available to the contractor. It is controlled by the reviewer/Owner
		Asset Name	(Keyedin) Text(20) FORMAT:	Null	Is the human readable name for the asset is system generated
		Inlet Type	Bridge Deck Drain, Catch Basin, Inlet, Slotted Drain, Yard Drain, Drop Inlet	Null	Is indirectly required
		Access Opening (in)	Numeric range 0.00-72.00	Null	Isindirectly required
		Rim Elevation (decimal ft)	Numeric	Null	Isindirectly required
		Low Pipe Invert Elev. (decimal ft)	Numeric	Null	Isindirectly required
		Access Material	Cast Iron, Ductile Iron, Other	Null	Isindirectly required
		Access Type	Door, Grate, Cover, Unknown	Grate	
		Owned By	INDOT, Local Gov, Other	INDOT	
		Inlet Comment	(Keyedin) Text(250)	Null	Isindirectly required

DB Triggers that help the workflows, moving data through the swim lanes. Some vendor statuses trigger other fields and vice versa



#### Helping the effort

- Editor tracking
  - Last edited user, last edited date
    - Applies email address when accessing via web service and applies network username when using ArcMap
  - Push created date into the inspection date
    - Since we are listing inspections by date, we need to ensure the date is being captured

#### The future is now

- Predictive analysis of assets, prescriptive treatment options for our major assets, bridge and pavement
- Bundling work for cost advantage and minimizing network disruption

Questions??